A Complete Strategy for Bicycle Infrastructure

KCMO Street Network

KCMO On-Street Bike Lane Network
Measuring Demand

Where would people ride if it was safe and comfortable to do so?
Public Input

- What types of trips do people take or want to take?
- Where do people want to ride?
- What types of facilities do people prefer?
- Where are areas of concern (safety, access, etc.)?
Network Connectivity

- What routes are critical to establish an interconnected system?

- What projects bridge major gaps in the bicycle network?
Safety and Collisions

- Areas with high frequency of crashes
- Areas with high frequency of crashes per bicycle miles travelled
- Crash types at problem locations
- Street type
- Existing bicycle facilities
- Posted and observed vehicle speeds
Equity

- Areas with high concentrations of carless households
- Areas with limited transit service
- Areas with high concentrations of poverty
- Areas with high average commute length/time
Feasibility for High Level of Comfort

- Topography
- Major barriers (highways, railroads)
- Opportunities for a direct route
- Traffic speed
- Available space for facilities
Measuring Demand

- Latent Demand Analysis - Where would people ride bicycles if facilities made it convenient and comfortable to do so?

- Not intended as a trip projection tool

- Traditional travel demand models don’t account for circulation network, street, or built environment that are minor for car trips but very important for cyclists.

- Observations can’t be a direct proxy for latent demand because they already internalize physical barriers and constraints that impact a cyclist’s decisions.
Measuring Demand

- GIS-based analysis using City and Census data

- Citywide bicycle observations could be used to calibrate based on statistically significant factors that relate to observed behavior

- Without observation data, we used the most complete national research available to make assumptions about how and where people would ride.
Demand Analysis Model

- Population Density
  - Demographic Modifiers
    - Adjusted Population Score
    - Generators Score
    - Land Use Diversity Modifier
    - Bicycle Demand

- Employment Density
  - Employment Destinations
    - Retail/Services Destinations
    - Schools/Religious Destinations
    - Social/Entertainment Destinations
    - Recreation Destinations
    - Transit Destinations
  - Distance Modifiers
    - Adjusted Employment Score
    - Destination Split Modifier
    - Attractors Score

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Research on Cycling

- National data helped to inform the weights and factors applied to this demand analysis
- Demographic profiles of cycling use were combined with local census data to modify trip generation likelihood
Demographic Modifiers

- Areas in red have a demographic profile with the strongest positive correlation to bicycle trips.
Adjusted Population and Employment Density

Adjusted population density

Adjusted employment density
Bicycle Trip Attractors

- Employment Destinations
- Retail/Service Destinations
- Recreation Destinations
- School/Religious Destinations
- Social/Entertainment Destinations
- Transit Destinations
Land Use Diversity Modifier

- Research shows a positive correlation between mix of uses and bicycle trips.
Findings

- Highest demand: Downtown, Westport, and the Plaza. High demand also exists in corridors connecting these nodes, as well as large portions of the historic northeast.

- Pockets of high demand follow parkways through developed areas of the east side and northland.

- Generally, high demand areas are those with a combination of many potential destinations, high population densities, and a diverse mix of uses.
Findings

- Many streets with bicycle lanes are located in areas with low to moderate demand.

- Existing bike lanes on Emmanuel Cleaver, Chouteau Pkwy, and Charlotte/Holmes are located in higher demand areas.

- Planned improvements throughout the urban core are poised to serve areas of high demand much better, but key areas of need remain:
  - North-south route connecting Downtown, Westport, Plaza,
  - Route serving densest parts of Northeast.
Making the Model Better

- Gather local data!
  - Calibrations based on local observations

- Measurement of regional and inter-community demand

- Incorporation of generators and attractors outside of City limits

- Revised model weights and factors based on evolving understanding of future bicycle travel patterns.
High Bicycle Demand
North
High Bicycle Demand
South